

Pathfinding Partnerships Award

For research that engaged four or more distinct research entities in Colorado (with at least two being federally-funded labs) whose results leveraged the resources and strengths among partnering organizations – and demonstrated the power of collaboration.

**The Wildfire Research (WiRē) team:
Supporting evidence-based practice
to help communities live with
wildfire**

NOMINATION ABSTRACT:

The Wildfire Research (WiRē) works side-by-side with local wildfire education practitioners to develop evidence-based community wildfire education programs. The WiRē process pairs social data from residents living in the wildland urban interface with parcel level wildfire risk data. Project are driven by a need and invitation that comes from the community partners and builds on over 30 years of world-class fire science at Co-Lab member Rocky Mountain Research Station. In addition to the longstanding experience with the physical risks of fire, the program is using cutting edge social science and community engagement to provide tailored information to suit the needs of different audiences.

THE BACKGROUND CONTEXT SHAPING THE NEED AND INTEREST IN THIS RESEARCH.

Nearly half of Colorado's 2.5 million residents live in areas facing high wildfire risk. Colorado's growing wildland-urban interface, the place where fuels for fire transition from natural vegetation to communities faces unprecedented risk. Fostering adaptation to this ongoing threat requires collaboration and investments from a range of stakeholders, across vast landscapes. The actions of property owners in fire-prone communities play a critical role in reducing property-level and community-level risk, reducing the likelihood that homes burn and lives are lost. Rocky Mountain Research Station has played a catalyzing role in establishing the fire science that enables this understanding. Indeed, the science on wildfire risk reduction establishes clear guidelines on how to reduce the likelihood of home ignition, the primary driver of community wildfire disasters. Despite clarity on such guidelines, moving residents in fire-prone communities to implement actions presents one of the most significant challenges across the American West.

The methodological approach for the WiRē (Wildfire Research, pronounced "wy-ree") Approach, which has been co-produced through iterative, collaborative efforts between the WiRē team and wildfire practitioners in the western U.S. over the last decade. The WiRē Approach is rooted in fire science and social science and was built on the assumption that data collected at the scale of local programs, standardized to allow for replication across space and time, using a co-productive process that intertwines research and practice, help assure that the science is useful and actionable.



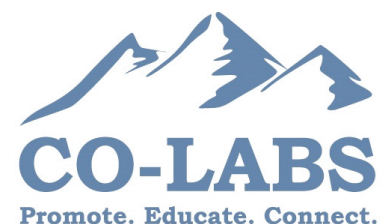
NAME OF PRINCIPAL INVESTIGATOR(S) OR TEAM:

1. Patricia A. Champ
2. James R. Meldrum
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Started in 2009, the annual Governor's Awards for High-Impact Research celebrates the brilliant ground-breaking discoveries and innovative research from Colorado's ecosystem of federally-funded laboratories and institutions.

Organized by CO-LABS, each year's event spotlights the men and women creating our future through brilliant technological and engineering discoveries in aerospace, energy, agriculture, public health, weather prediction, wildlife ecology, communication, earth science and dozens of other fields of research right here in our communities.





THE BACKGROUND CONTEXT SHAPING THE NEED AND INTEREST IN THIS RESEARCH (CONTINUED)

The WiRē Approach aims to empower wildfire practitioners who work at the frontlines of wildfire risk reduction with local, relevant data. Historically, wildfire social science has merely been descriptive, falling short of deep engagement with practitioners whose local expertise is critical to successful program implementation. Project partners participate in project scoping, data collection, and identification of results relevant to the communities they serve. The WiRē Approach uses biophysical and social data collected at the parcel-level to investigate whether communities within a contiguous geographic area are distinct in dimensions relevant to tailoring wildfire preparedness and mitigation education efforts. The research attends to the notion that there is not a one-size-fits-all approach to fire adapted communities by investigating what (e.g., the messaging, the programs, the communication mode), if anything, about wildfire education efforts should be tailored to the local context. The research team summarizes local data and collaborates with project partners to share results to build a common foundation for constructive approaches to wildfire adaptation. While the work has direct benefits to project partners, it also contributes to the research literature by expanding beyond characterizing social dimensions of fire-prone communities.

The WiRē Approach is built on 4 tenets:

- i) Homeowners are critical actors in the WUI wildfire problem In the WiRē Approach, residential properties and property owners' beliefs and behaviors are the units of analysis because of the critical role they play in the WUI wildfire problem. Residential property conditions are an outcome of property owner decisions who shape their wildfire susceptibility starting from the day they decide which property to purchase. Once purchased, property-related decisions from day-to-day property maintenance to significant home improvements, such as replacing roofing or siding or adding a deck, all shape the likelihood of home ignition.
- ii) Action is central to adaptation to escalating wildfire risks. Owners' perceptions and understandings of wildfire that influence the decisions and actions that shape the likelihood of an ignition turning into a wildland-urban interface disaster. Mitigation reduces the likelihood of ignition and can alter fire severity, evacuation preparedness ensures homeowners can protect the safety of their families, pets, and valuable possessions during a wildfire.
- iii) People and their decisions are complex Despite the apparent simplicity of core recommendations for risk reduction on private properties and to move people out of harm's way through evacuation, there is a large gap in implementation. Although there is a recognition that there is not a one-size fits all strategy to reducing wildfire risk to communities, there is not guidance on how best to attend to community uniqueness (USDA 2022), in part because people and their decisions are complex.
- iv) Decisions are not made in a vacuum Property owner decisions are also shaped in part by the broader context in which any property sits. Fire prone communities are not uniform in their characteristics, fire history, or capacity to adapt to wildfire risks. Complex contextual factors influence relationships between people and the surrounding landscapes.

“The Wildfire Research (WiRē) Team is honored to be a recipient of the 2024 Governor’s Award for High Impact Research. The WiRē team is a great example of the whole being greater than the sum of the parts. Improving the wildfire resilience of Colorado communities through our collaborative research-practice approach leverages the support provided by our federal, state, university, fire service, and nonprofit organizations.”

**- Patricia A. Champ
Research Economist, Human Dimensions Program, Rocky Mountain Research Station
USDA Forest Service, Fort Collins, CO**



THE COMPELLING FACETS OF THE, OR THIS TEAM/PERSON'S, RESEARCH AND WHAT WAS THE ULTIMATE KNOWLEDGE AND INSIGHT DISCOVERED.

The WiRe Team's research discoveries reflect an evolving research-practice agenda to address important issues in the field of wildfire social science and wildfire education practice. The research moves beyond simply characterizing the problem to supporting a scientific approach to addressing a social aspect of wildfire. Specifically, the WiRe work addresses the lack of data/science to guide evidence-based efforts to build sustainable wildfire programs around the unique social aspects of community residents.

The WiRe team is built on a research-practice model where research informs practice and practice informs research. The partnership developed a systematic data collection approach that pairs data on the biophysical wildfire-related characteristics of every parcel within a community with social data about the perspectives, attitudes, and behaviors of the individuals who live on the parcels. The research has shown that the systematic social and biophysical data differ substantially across study communities. The WiRe team has taken a rigorous statistical approach to analyzing WiRe data to make inference across communities and tease out causality.

For example, the research found that residents living on the highest wildfire risk parcels are less likely to participate in a cost-sharing program, there is a gap in how residents view wildfire risk on their parcels compared to wildfire professionals, residents who mitigate wildfire risk are more likely to have neighbors who also mitigate (and vice versa), risk averse residents report better mitigated parcels and are assessed by professionals to have better mitigated parcels despite a gap between the professional and self-reported assessments of parcel-level wildfire risk.

Aggregating social data from 68 communities across six counties in southwestern Colorado, the WiRe team discovered that general attitudes about wildfire and what can or should be done about it were similar across different communities and counties. However, the social characteristics of a community that can guide programs such as where residents get information about wildfire, expectations about what will happen in the event of a wildfire, and measures of mitigation and preparedness, were found to vary substantially across communities.

Combining WiRe data, burn probability, and conditional fire intensity data allowed for the estimation of causal models that allowed for attributing directionality between risk perceptions and parcel-level wildfire risk. The analysis explores the relationship between the WiRe parcel-level risk assessments and wildfire outcomes when the 2020 East Troublesome Fire destroyed homes in the Columbine Lake community in Grand County, CO. The results demonstrated that even coarsely measured parcel-level risk assessment data capture meaningful differences in wildfire risk across a community. The results also underscored that relatively small actions by residents before a fire can influence wildfire outcomes. Implementation of the Forest Service's 2022 Wildfire Crisis Strategy (<https://www.fs.usda.gov/managing-land/wildfire-crisis>) recognizes the role the public plays in supporting the dramatic scale and pace of forest health treatments.

A recent WiRe team publication examined how survey respondents viewed the use of fuels reduction management actions to reduce wildfire risk on public lands adjacent to study communities. The results highlight broad public acceptance of management practices while highlighting notable variation related to the type of management practice and the study location. The results demonstrate that in some places there is clear social acceptance of public land management practices to reduce risk while in other places, attending to community concerns may be needed to ensure successful public land management that achieves intended risk reduction.

Recent concerns about economic equity in the administration of wildfire mitigation programs were investigated with a revisit to past study focused on a cost share program for vegetation reduction to mitigate wildfire risk in western Colorado. Results showed that residents with lower incomes are less likely to participate even though they can choose to contribute 0% toward a cost share. As wildfire education programs often focus on both mitigation of wildfire risk on private land and preparation for evacuation in a wildfire event, the partnership shared preliminary results of research that investigates if individuals who complete more mitigation actions are more or less likely to complete preparation actions. The rigorous econometric analysis that controlled for the diversity of 20 study communities found that individuals who complete more mitigation actions have also completed more preparation actions. The research that is produced through WiRe partnerships is a reflection of its iterative, co-productive partnership with wildfire practitioners who help drive critical inquiry to foster evidence-based practice. As such, practitioner partners are often co-authors on peer-reviewed publications.



HOW THIS RESEARCH HAS BEEN APPLIED, UTILIZED, COMMERCIALIZED OR OTHERWISE ADOPTED OUTSIDE THE LAB

To date, the WiRe team has worked with 9 primary partners (22 affiliated partners) in 40 communities in Colorado. The WiRe Approach guides each project and aims to empower wildfire practitioners who work at the frontlines of wildfire risk reduction with local, relevant data. Project partners participate in project scoping, data collection, and identification of results relevant to the communities they serve. The WiRe Approach uses biophysical and social data collected at the parcel-level to investigate whether communities within a contiguous geographic area are distinct in dimensions relevant to tailoring wildfire preparedness and mitigation education efforts. While we use a standard approach that replicates two core data collection efforts, the iterative, collaborative nature of the work ensures that the work is responsive to our partners' organization priorities, the local context, and the evolving science. The research team summarizes local data and collaborates with project partners to share results to build a common foundation for constructive approaches to wildfire adaptation.

Data from our projects are used in a number of ways, including helping our project partners complete their work, telling the stories of their work, motivating and populating grant proposals, showing change over time, and facilitating new understandings. Three examples:

First, the WiRe risk assessment, a rapid parcel-level risk assessment is now used by our Colorado State Forest Service (CSFS) partners in fire-prone areas well beyond WiRe project areas, ensuring a standard metric is used in their service areas that enables data comparability. After our project in Chalk Creek Drainage, our partner CSFS JT Shaver said:

"The work with the WiRe Team within the Chalk Creek Drainage has been very beneficial for the Colorado State Forest Service (CSFS) Salida Field Office. ... The response from private landowners has been outstanding. CSFS foresters have met with over 25 landowners within Chalk Creek to discuss their wildfire risk and the steps they can take to lessen their risk. Some of these site visits have led to the development and completion of a defensible space project to reduce fuels around structures. Thanks to the hard work of the WiRe team, the Colorado State Forest Service has been able to reach more landowners in a high priority area to educate them as well as make them more proactive to lessen their wildfire risk."

Second, the WiRe process itself facilitates deep engagement with the local study context that illuminates opportunities to build pathways toward community wildfire resilience. Our partner at Genesee Fire Protection District, Dorie Dalton explained:

"I mean, I've lived in this community for 12 years, but I had not been down every street I had not seen every house and met all the people that I've met, right? And so, [the rapid assessments] definitely helped me to engage in with my community in a very personal way, with my boots on the ground."

"The survey helped me to understand the thinking of my community members and how to move forward with some of the priorities we had identified in the CWPP" - including moving the needle on community acceptance of building a new emergency egress road.

Third, household survey data were used by the (former) executive director of West Region Wildfire Council to before the town council of the Town of Mountain Village, San Miguel County, to highlight data that refuted the dominant assumption that local residents were not concerned about wildfire, nor were they willing to cut down trees on their properties to mitigate wildfire risk. The survey data demonstrated that most Town of Mountain Village residents were indeed willing to remove trees to reduce wildfire risk. However, almost half of the residents viewed local homeowner association restrictions on tree cutting as a barrier. The availability and presentation of locally relevant social science did two things: first, it changed the conversation in the community; second, it identified a path forward for the town council. The lesson showed how locally tailored social science can foster needed transformations in local and regional conversations about new, sustainable pathways toward reducing wildfire risk to communities.



HOW THIS RESEARCH HAS BEEN APPLIED, UTILIZED, COMMERCIALIZED OR OTHERWISE ADOPTED OUTSIDE THE LAB (CONTINUED)

The solutions reported here are a starting point and rest in the notion of evidence-based practice can serve as a critical foundation of building local adaptive capacity. These are three examples that reflect that the kinds of solutions that can emerge with systematic data and collaborative, iterative processes. Additional outcomes from the WiRe Approach include:

The partnership uses risk assessment data to identify high priority areas for local practitioner partners. It uses social data to identify where high acceptability of fuels management (i.e., prescribed fire) can enable the swift project implementation to manage risk and where low acceptability should be met with community education and engagement to build trust and understanding between implementers and the public. Project results are used to identify key messaging and outreach opportunities to increase community engagement in mitigation and emergency preparedness actions as complements to reduce risks to public safety and likelihood of wildfire losses and harm.

More so than anecdotes from our project partners, evidence of the value of the work, the results, and the partnerships rests in the on-going engagement between the WiRe team and our project partners. We have conducted multiple projects with the same primary partners, building insights and a compiled dataset across the state. And finally, all WiRe partners, past and present, participate in a Community of Practice (CoP). Held virtually every quarter, and in-person every 18 months, this CoP provides an opportunity to share technical and experiential insights on wildfire mitigation and preparedness, particularly as it relates to data collected through the WiRe process. WiRe project partners share successes and challenges in their work serving fire-prone communities, and the engagement provides an opportunity for researchers to understand how the data are being used, evolving new challenges among wildfire practitioners and how research might evolve to provide better data and insights.

About CO-LABS:

Started in 2007, CO-LABS is a non-profit consortium of federal laboratories, research institutions, businesses and economic development organizations that provide financial and in-kind support for programs that promote the retention and expansion of Colorado's federally-funded scientific resources. Through events, economic analyses, strategic communications and networking activities we work to:

- PROMOTE Colorado as a global leader in research and technology
- EDUCATE the public about federal research labs' and institutions' impact, and importance of sustained funding for research
- CONNECT the labs, universities, economic development organizations and businesses to facilitate partnerships and technology transfer



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